

1 to --

2 DR. LUCKY: We're talking about the
3 rules for the band, though.

4 MR. REILLY: No, I would not put that -
5 -

6 DR. LUCKY: You wouldn't. Okay. Would
7 you buy the receiver regulation?

8 MR. REILLY: No.

9 DR. LUCKY: Okay. And wouldn't buy the
10 geography stuff?

11 MR. REILLY: When you say, I'm buying
12 it with regard to inputting into the rules, as
13 opposed to having standards bodies, having the
14 industry collectively discuss the issues, identify
15 what, in fact, makes sense with regard to ways
16 going forward. And then the market will adjust
17 with regard to implementing or not implementing.

18 MR. LEARY: With respect to power in
19 the rural environment, maybe I'd have some
20 disagreement here. I'm not entirely convinced.
21 Give me the lower band, I'll take that over the
22 power because, you know, I can already do 300
23 square miles from a single location with existing
24 power in those areas where you can see your dog
25 running away for two days. However, in most of the

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1 world, you know, the problem is --

2 DR. LUCKY: That's a good criterion, by
3 the way.

4 MR. LEARY: It's a problem of --

5 DR. LUCKY: That's a good definition of
6 rural.

7 MR. LEARY: But seriously, it's a
8 problem of foliage, not necessarily of power. And
9 also, in a data environment you have to take into
10 account the reality of latency, so we could get
11 lots of power. Okay. Fantastic, out at 60 mile
12 link, but then I've got, you know, a certain amount
13 of latency that's unavoidable because of that
14 distance, so give me the lower band. I'll take
15 that any time over the power.

16 DR. LUCKY: Okay. Over there.

17 MR. SNYDER: Two related questions.
18 Earlier when we talked about beach front spectrum,
19 and you could take Sahara Spectrum, you know, high
20 frequencies as a contrast point. Does spectrum
21 Etiquette systematically vary based on frequency?
22 We've assumed here that I think etiquette is sort
23 of homogenous, regardless of the band, but are
24 there systematic differences?

25 I, for example, think the UNII Band is

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1 too high for a lot of valuable unlicensed
2 applications. Your comment would bolster that, so
3 that's -- are there any systematic differences
4 based on frequency? And the second question is,
5 let's take spectrum below 3 gigahertz and above,
6 could you give me a specific number as to what
7 percentage of that spectrum should be allocated for
8 unlicensed? Would it be 10 percent under 3
9 gigahertz, and 5 percent between 3 gigahertz and 30
10 gigahertz, or would it be the same spread equally?

11 You know, with land, 90 percent of the federal
12 lands is, you know, on the other side of the
13 Mississippi, on the western side of the
14 Mississippi.

15 Are there systematic differences as to
16 where this unlicensed spectrum should be allocated
17 because of, you know, etiquette related issues
18 around frequencies?

19 DR. LUCKY: Okay. Well, the answer to
20 your first question is yes, and the answer to the
21 second is 27 percent.

22 DR. NEGUS: Yeah. I'd like to re-
23 emphasize. Bob is correct, it is 27 percent.

24 DR. LUCKY: I think 27.5.

25 DR. NEGUS: Presumably, when you say

1 unlicensed, do you mean something like the ISM Band
2 or the UNII Band, where unlicensed has a preferred
3 home? Let me remind you, under 15.209 you can put
4 unlicensed in most places under 40 gigahertz as
5 long as you avoid the places that are drilled out,
6 and as long as you stay at a very low level of -40
7 dBm per megahertz. But I think what you're talking
8 about is higher powers.

9 DR. deVRIES: Yeah, I just want to --
10 yes. And I think, you know, to answer your first
11 question, or to address your first question, you
12 know, if I think here about, you know, a place
13 where "unlicensed" has a special home, or
14 essentially where, you know, there is no single
15 owner of the use of that band, I think the lower
16 you go, the more important spectrum Etiquettes or
17 sharing rules become, because it propagates
18 further. And so if you're up, you know, at a part
19 of the band where it doesn't go through walls, gee,
20 you know, do you really need it?

21 Well, actually in some cases if you've
22 got thin walls, you live in an apartment, yeah, you
23 probably do. But if you're, you know, down where
24 it goes for miles, you absolutely need those
25 things.

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1 DR. LUCKY: Okay. I think it's time to
2 change gears. I appreciate the specificity that we
3 got to, even though everyone had a different
4 proposition about what should be done, so I'll turn
5 it back over to Mike.

6 DR. MARCUS: Okay. Well, let's be a
7 little bit more explicit. Dudley talked a little
8 bit about the antenna problems that the wireless
9 ISP community is having, and their desire to mix
10 and match antennas. We -- the current restriction
11 on antennas and cabling comes with the more general
12 Part 15 devices, which include cordless phones,
13 remote control cars, and things like that where it
14 really doesn't make any sense to allow people to
15 put any antenna on it. So one question is, if we
16 were to -- if the wireless ISP industry is having
17 major problems with that, can they come up with any
18 better ways of allowing other antennas, but that
19 keeps the intent of our rule, you know, the narrow
20 rule.

21 But the second question, which is a
22 close cousin of that is, in 15.209, which I keep
23 mentioning, which allows unlicensed virtually
24 anywhere under 40 gigahertz, the current level of
25 500 microvolts per meter and -40dBm for megahertz,

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1 depending which units you want, currently applies
2 everywhere from 960 to 40 gigahertz. Is that the
3 right number? If it isn't the right number, how in
4 the world would we go around determining what the
5 right number is?

6 So those are two possible changes to
7 our rules that may or may not be helpful, or may or
8 may not change the balance of power. And does
9 anyone on the panel want to talk about either of
10 those?

11 MR. FREEMAN: The first part, I think
12 we should consider having the antenna manufacturers
13 just submit through a testing lab the specs of the
14 specific antenna that would have the same
15 characteristics of the antenna that comes from the
16 specific manufacturer. Remember, the specific
17 manufacturer is not in the antenna business anyhow,
18 unless it's an integrated product.

19 DR. MARCUS: Okay. So you would have
20 the manufacturer say, or submit for approval to the
21 FCC or the -- whoever does the approval --

22 MR. FREEMAN: Right.

23 DR. LUCKY: So I can't use a Pringle's
24 can?

25 MR. FREEMAN: No, I don't think so.

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1 DR. LUCKY: I want to use the Pringle's
2 can.

3 DR. NEGUS: Pringle's can certify their
4 antenna then.

5 DR. LUCKY: Pringle's could certify
6 their can.

7 DR. MARCUS: So the specs that you, the
8 manufacturer of the transmitter, say you would
9 issue some spec, and if Pringle's met that spec --

10 DR. LUCKY: And right on the can it
11 would have a Good Housekeeping seal of approval,
12 you know, approved for use after you've eaten the
13 potato chips.

14 DR. MARCUS: Yeah. Dual use
15 technology.

16 MR. FREEMAN: The other thing is the
17 clear understanding that professional installation
18 is required for the systems in the fixed broadband.

19 DR. LUCKY: Oh, no.

20 MR. FREEMAN: Installation.

21 DR. LUCKY: We've got all these
22 volunteer hot spots out there.

23 MR. LEARY: A different network.

24 MR. FREEMAN: Different network.

25 MR. LEARY: Different network. We're

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1 talking infrastructure from basically predominantly
2 tower --

3 DR. MARCUS: Now if it was a turnkey
4 system that you bought in Radio Shack as a turnkey
5 system, do you think professional installation
6 would still be required, or only if you buy your
7 own antenna?

8 MR. FREEMAN: Well, I think
9 professional installation for the -- what we do as
10 a last mile provider, or a big pipe between two
11 buildings requires a professional installation.
12 And the reason I think it requires professional
13 installation is because again, we go back to the
14 cowboy mentality where they buy this equipment, and
15 they juice up the amplifier and so forth, and so
16 on. You have someone who is certified by each
17 manufacturer of using, how to install and
18 understand the equipment.

19 DR. MARCUS: So Kevin certifies the
20 manufacturer. Kevin certifies the installer.

21 MR. FREEMAN: Kevin certifies the
22 installer. He takes a course, or his distributors
23 teach a course all about the product and how to
24 install it.

25 DR. MARCUS: Okay. Vanu was shaking

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1 his head about --

2 MR. FREEMAN: By the way, that's in the
3 rules.

4 DR. LUCKY: Are you a professional
5 installer? I mean, do you do that stuff?

6 MR. FREEMAN: Not often.

7 DR. MARCUS: Okay. Vanu was shaking
8 his head about that, but also shaking his head
9 about the power -- on the power limits.

10 DR. BOSE: Yeah, I've got a bunch of
11 things. Yes, on the power numbers, your question
12 was was that the right level adequate? And the
13 simple answer is no, because you don't see any
14 commercial products out there doing anything with
15 that. It's simply not enough.

16 Now I hate to keep harping on the same
17 point, but this goes back to receiver standards.
18 If there were standards so that receiver standards
19 in all the bands have to tolerate a certain amount
20 of background interference, now you could bring in
21 devices, like ultra wideband to start, but other
22 things that sort of operated under the radar, and
23 make that more useful. And we've actually done
24 stuff in the lab at those levels and, you know, you
25 can transmit a few feet, and there are just not

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1 that many applications.

2 DR. MARCUS: Well, most systems above
3 10 to 40 gigahertz, tend to have highly directional
4 antennas.

5 DR. BOSE: Yeah, up above 10, that's a
6 different issue.

7 DR. MARCUS: Well, I mean, but part of
8 the question is, is the number between 10 and 40,
9 should it be 500 microvolts per meter, or should it
10 be lower, should it be higher?

11 DR. BOSE: Well, I think it's a
12 different issue --

13 DR. MARCUS: How would you figure it
14 out?

15 DR. BOSE: Well, when you get to 10 and
16 40, when you have such directional transmission, I
17 think that becomes less an issue, because there's
18 less chance of interference.

19 DR. MARCUS: So what number would you
20 write? If you wrote the rules, what number would
21 you write?

22 DR. BOSE: You know, 27 percent.

23 DR. MARCUS: How would we determine
24 what the 27 number is?

25 MR. STEVENSON: In the 24 gigahertz

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1 band, the Commission adopted a report and order
2 increasing the field strength from 250 millivolts
3 per meter at 3 meters, to 2,500 millivolts per
4 meter. There was -- but with a requirement for
5 directional antennas of at least 33 dBi. So the
6 argument there was that the total area encompassed
7 would be smaller, you know, or certainly no more
8 than the lower power with an omni antenna.

9 DR. MARCUS: Well, should we extend
10 that up to 40 gigahertz, or should we keep that
11 only in the 24 gigahertz band?

12 MR. STEVENSON: I think you have to
13 look at what you have to live with there.

14 DR. NEGUS: Well, I would answer yeah,
15 you should. But I think you should across
16 virtually -- I hate to speak and not think through
17 the consequences on every band, but that concept, I
18 think, applies across every band from DC to
19 daylight.

20 DR. BOSE: Well, not only that. I want
21 to make the point that I think that's something in
22 the spectrum that the Commission should encourage
23 because, you know, if you look at David Reed's
24 argument that going into the future, once we've
25 sort of taken care of all the legacy

1 inefficiencies, and spectrum is pretty fixed and
2 usage increases, we've got to go to more dense
3 lower power transmitters, and this is a way to
4 start encouraging that use, is letting people do
5 more things at lower power under the radar.

6 MR. STEVENSON: Another point, if I
7 could is, is not just a question of transmitter
8 power. It's a question of EIRP. For example, in
9 99.231, the comments that my company filed, we
10 advocated actually a lower power than the
11 Commission ended up adopting but, you know, we
12 advocated the use of higher directional antenna
13 gain before you had to start backing off on the
14 transmit power. Because you take advantage of
15 antenna gain at both ends of the link on point-to-
16 point links, and you can end up getting the same
17 margin to a given bit air rate at the same distance
18 with less EIRP. You're discriminating against
19 interfering with systems off to the sides and
20 overshoot beyond the intended end-point, so there's
21 more bang for the buck in higher antenna gains,
22 more directive antennas than omni antennas, or low
23 gain antennas and brute force power.

24 PROF. RAO: I wanted to add a few
25 comments here. I think the antenna issue is

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1 actually related to the architectural issue. I
2 think .11(b) technologies have been extremely
3 successful at the access level, where you're trying
4 to reach a large number of people. But if you want
5 to build the one level up from there, the back haul
6 so that you can afford to go wireless a longer
7 distance, that is where you start to need more
8 directional antennas.

9 And to the extent that we feel that
10 there is a need to stimulate and incentivize the
11 development of technologies that will not just work
12 in a single hop, but work multi-hop, I think paying
13 attention to the directionality of the antenna and
14 the kinds of power levels that you're allowed to
15 use, I think will become critical.

16 MR. LEARY: I really need to defend the
17 professional installer clause for -- with respect
18 to the infrastructure. Two reasons why. Last
19 year, I think the number was 116 people died from
20 tower accidents, the highest number ever. That's
21 one.

22 Two, I give you an example of a school
23 in the northeast who one day they came back from
24 the weekend, all the water fountain motors were
25 dead. Well, over the weekend they had a lightning

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1 storm, but the installer who didn't know any
2 better, grounded to a water pipe. Went down, blew
3 the motors in these waters fountains. Had a child
4 been using that while this occurred, the child
5 would have been likely killed, so in terms of
6 infrastructure, not on wireless lands, not on
7 public hot spots, but on legitimate infrastructure
8 - this is broadband after all, folks. This isn't
9 some little hobbyist thing. These are providing
10 critical services to schools, police, fire even in
11 those occasions, hospitals, and for businesses as
12 primary connections. You know, it's not some silly
13 little, cute little niche activity here in the
14 free-net community. This is real, live, legitimate
15 infrastructure, and in those environments there
16 needs to be a stronger professional installer
17 clause.

18 DR. BOSE: Well, I'd like a maybe
19 tighter definition of infrastructure there. Let me
20 give you an example. You know, I've got an 802.11
21 hub in my apartment, and the last time I checked
22 there's seven other people using it for access to
23 the Internet. Am I an infrastructure provider?

24 MR. LEARY: No, you are not. The last
25 hundred feet is distinctly different from last

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1 mile.

2 DR. deVRIES: So let's assume that
3 Vanu, you know, that a few years from now there's
4 "unlicensed" spectrum lower in the band, where he
5 can, in fact, reach more people, and he's one of a
6 group of people that build out a mesh that cover
7 square miles, is he an infrastructure provider?

8 MR. LEARY: Not in the mesh
9 architecture if it's deployed like that. I'm
10 talking about things specifically deployed on
11 towers, tops of buildings, different --

12 DR. BOSE: So it seems like you're
13 keyed to power and height.

14 MR. LEARY: I am. It's location-based.

15 DR. BOSE: Okay.

16 MR. LEARY: For example, if it's in
17 your home, single story building, no. But if
18 you're the installer and you're climbing on the
19 third floor, and you're mounting something on the
20 outside, so yes, it is location-based in that
21 sense. And I think there's even OSHA elements in
22 that that certainly cross over.

23 DR. BOSE: Well, I guess one sort of
24 example on the boundary is Direct TV dishes. I
25 climbed out the side of my house and bolted it up

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1 there. And, you know, it might not be that
2 lightning proof.

3 DR. MARCUS: Let's ask David Reed.
4 He's been trying to say something here.

5 MR. REED: This is totally outside the
6 technical field, but I would just point out that
7 we're emphasizing the reason that local electrical
8 codes exist, not the reason the FCC exists. And if
9 we really want to regulate people falling off
10 towers, or not getting lightning storms, that's an
11 electrical code issue, not an FCC issue.

12 MR. LEARY: It's the behavior of people
13 as operators in unlicensed spectrum.

14 MR. REED: Oh, sure. But what I'm
15 saying is the --

16 MR. LEARY: So, I mean, there is an FCC
17 overlap, and certainly NEC, and OSHA, as well.

18 MR. REED: But NEC is the place to do
19 that, and surely we don't need to have installers
20 worrying about the EIRP in the NEC so, you know, I
21 really think those are totally separable.

22 DR. NEGUS: I think this is analogous
23 to the FCC regulating cell phones while driving. I
24 mean, right? I mean, it's a communications device.
25 People are distracted while driving, and I don't

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1 know. I have no idea what the statistics are, but
2 I'm sure it's more than 116 people year in the
3 United States are killed by driving while being
4 distracted on their cell phone. But I don't think
5 that's an appropriate issue for the FCC.

6 MR. REED: Yeah. The DOT is worrying
7 about that. It's a fine place for it to be worried
8 about.

9 DR. MARCUS: Okay. We only have two or
10 three more minutes to go. Get away from the
11 professional installer issue for a minute, are
12 there any other issues that people have that they
13 think are important? Yes.

14 MR. REILLY: Just one I'd like to make
15 is, you know, throughout the discussion today, this
16 morning and both panels, we talked a lot about
17 unlicensed. We've had some discussion of licensed.

18 And I made the point earlier that I think there's
19 a lot to be learned from the experience with
20 licensing by rules that took place with regard to
21 Part 15. And we ought to look at opportunities to,
22 in effect, have streamlined licensing processes.

23 And I think that brings up another
24 point, which is that there may be a tendency to
25 think about unlicensed as related to either

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1 enterprises or residential users, and to think of
2 licensed as perhaps related to carriers or service
3 providers. I think with the kinds of technologies
4 and the capabilities that we're talking about now,
5 it's appropriate, you know, to disassociate
6 technology from who is utilizing it.

7 I think there will be opportunities
8 with the higher frequencies, with regard to more
9 directional antennas, to have distances where a
10 service provider may want to operate in an
11 unlicensed mode between -- to kind of extend a
12 fiber optic system in an environment that might not
13 otherwise be appropriate for bearing fiber. Or
14 there may be, you know, private sector users that
15 are looking to have a licensed operation because
16 they want to put it in, and they want to have the
17 benefits that derive from the rights associated
18 with licenses, but that process should be
19 streamlined so they don't have to wait six months
20 or more in order to get in operation, so that's
21 just a point I'd like to make.

22 DR. MARCUS: Okay. Let me point out
23 that people who want to give us inputs on certain
24 philosophies of licensed versus unlicensed, in June
25 we issued a Notice of Proposed Rulemaking on 70-80-

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1 90 gigahertz bands, in which we proposed three
2 options for the bands on an equal -- at least in
3 the NPRM they're equally treated. We'll obviously
4 probably only adopt one, but one is licensed, one
5 is unlicensed, and one is a band manager, which is
6 sort of in-between. So if people have thoughts and
7 would like to try their thoughts in a specific
8 context, please feel free to send in comments to
9 the NPRM, and it's a much higher frequency, but
10 some of the philosophical issues apply here.

11 Does this side of the panel have
12 anything to say in the last minute or two?

13 DR. deVRIES: Just one last comment.
14 We seem to be making the distinction between
15 licensed and unlicensed very clearly. Just to say
16 that to me, the distinction is not that clear, and
17 I expect that as the devices that we build become
18 more intelligent, and some of the futures that are
19 being talked about become real, the distinction
20 will become even more blurred. And as the FCC
21 thinks about these issues, it needs to take a more
22 broad view about the range of possible ways of
23 regulating use of spectrum.

24 DR. MARCUS: Thank you very much. I'd
25 like to thank the panelists here. I don't want to

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1 rush you, but at 2:00 we're going to have the
2 experimental license panels in the same room with a
3 new cast of people. If you would like to stay here
4 for lunch, let me explain what the arrangements
5 are. You have to take the elevator up one floor to
6 the floor which is oddly labeled CY for courtyard.

7 You can go out the back of the building through
8 security. You have to give them your red badge.
9 They give you a card. Then you have to come in the
10 same door. There are two doors in the courtyard.
11 You have to come in the same one you went out of.
12 There are two restaurants there. If you want to go
13 down 12th Street to the seafood restaurants on the
14 waterfront, they take a little bit longer. There
15 is another cafeteria on the outside, there are
16 actually two on the outside of the building, or
17 there are two in the courtyard, and feel free to
18 stay here. And thank you all very much, and thank
19 the panelists for their excellent remarks.

20 (Off the record 1:03 - 2:07 p.m.)

21 DR. KOLODZY: Welcome back. Thank you
22 for coming back here. We're ready to get kicked-
23 off the third panel for the day and the final panel
24 on experimental licenses. I'd like to introduce
25 Lauren Van Wazer, who is the special counsel within

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1 the Office of Engineering and Technology, and also
2 the Deputy Director of the Spectrum Policy Task
3 Force. And I don't think I need to introduce
4 again, but I'll say Bob Lucky, who actually has
5 been co-moderating all three panels today, so I'd
6 like to turn it over to Bob and Lauren.

7 MS. VAN WAZER: Thank you, Paul.

8 I'd like to just start down this end,
9 and we'll do some introductions. Maybe you could
10 just say -- introduce yourself and say a word or
11 two.

12 MR. SOLOMON: I am Larry Solomon with
13 the law firm of Shook, Hardy & Bacon. I've been
14 practicing private communications law for longer
15 than I wish to disclose, and have worked on and
16 filed, and processed many experimental
17 applications.

18 MR. ROOSA: My name is Paul Roosa. I'm
19 with NTIA. I, too, have been doing this longer
20 than I care to admit but I might anyhow, 1966 I
21 started doing structure management stuff, so I have
22 worked from time to time on our processes of
23 reviewing experimental systems that we call major
24 systems. And that's why I'm here.

25 MR. LYNCH: Hi. I'm Mike Lynch, Nortel

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1 Networks. I do spectrum regulatory issues,
2 including experimental licensing, and spectrum
3 allocation issues. And probably one of the reasons
4 I'm here is some of the difficulties there.

5 MS. VAN WAZER: Well, that sounds
6 enticing. Why don't we skip over.

7 MR. HOARTY: I'm Leo Hoarty. I'm the
8 Chief Technical Officer of Dotcast, Incorporated, a
9 technology in Silicon Valley, developing a novel
10 wireless technology. I spent a good part of the
11 last year in these hallowed halls begging before
12 the Commission for experimental licenses, and
13 finally our authorization.

14 MR. HILLIARD: I'm David Hilliard with
15 Wiley, Rein & Fielding, and for more than 25 years
16 I've had the pleasure of working with some of the
17 folks in this room to secure experimental licenses
18 and other forms of approval from the FCC.

19 MR. FRANCA: Hi. I'm Bruce Franca.
20 I'm the Deputy Chief of the Office of Engineering
21 and Technology. I just want to point out that
22 we're in alphabetical order, and this is -- the
23 separation between me and Paul has nothing to do
24 with our close work together in ultra wideband.

25 (Laughter.)

1 MR. HILLIARD: I guess I'm glad to hear
2 that.

3 MR. BUCHWALD: Hi. I'm Greg Buchwald
4 with Motorola Labs in Schoenberg, Illinois, and I,
5 of late, have been responsible for obtaining
6 experimental licenses for our beyond 3g activities.

7 MS. VAN WAZER: Thank you. The
8 Commission's experimental license program is
9 supposed to provide manufacturers, inventors, and
10 entrepreneurs with the opportunity to test new
11 radio technologies and new equipment designs, among
12 other things.

13 In 1998, the Commission performed a
14 significant review of our experimental license
15 rules and made lots of changes, including allowing
16 longer license terms. They can be up to five years
17 now, allowing for blanket licensing, allows for
18 STAs without the prior issuance of an experimental
19 license. And also, adding some streamlining rules.

20 I'd like to find out, and particularly
21 since you made a comment that was intriguing. How
22 did we do?

23 MR. LYNCH: Well, essentially when it
24 comes to STAs and things that conform to DOS
25 allocation table, you do very well. But when

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1 you're working on products that are foreign market
2 products, at least our experience has been that it
3 doesn't work so well. I mean, especially when if
4 it happens to fall into the DOD arena. And I'll
5 summarize it, it goes to the IRAC and that's it.

6 DR. LUCKY: That's it?

7 MR. LYNCH: That's it.

8 DR. LUCKY: You don't get a reply back?

9 I mean --

10 MR. LYNCH: You may get a reply, but
11 there's no conversation about the reply. If it's
12 negative, it's negative and that's the end of
13 conversation. And I guess my --

14 DR. LUCKY: And how often does that
15 happen?

16 MR. LYNCH: Well, it's not how often.
17 It's just that it does happen, and it's
18 frustrating. We had a wireless open loop product
19 that we were trying to refine here in the U.S., and
20 it absolutely was not going to be possible to get
21 experimental licensing for it. There was another
22 product similar - we understood the controversy on
23 that one. We ended up doing it in a closed loop
24 fashion, which is still not the best way to test
25 our product. But the other one, in particular, was

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1 in a band that we told them in the beginning it
2 won't happen, and --

3 DR. LUCKY: And it didn't.

4 MR. LYNCH: No, it didn't. Yeah. And
5 it hurt our ability to fine tune and to sell that
6 product as a competitive product for a local loop,
7 for total quality in our local loop.

8 DR. LUCKY: Let me understand. Was
9 that in a military band?

10 MR. LYNCH: 450.

11 DR. LUCKY: What were you doing there?

12 MR. ROOSA: When did it occur?

13 MR. LYNCH: This was probably 1998.

14 MR. ROOSA: 1998. No wonder I couldn't
15 find any records about it this morning.

16 MR. LYNCH: It was a while ago, but it
17 isn't -- that's sort of well gone, and use it as an
18 example of what can happen. On the other hand,
19 after 9/11, we came in and asked for some stuff in
20 the 1710-1850 proportion for people nodes at Ground
21 Zero, and I think it took about five hours doing
22 OET and NTIA to get the permits out, and get the --
23 that worked quite well, but there was an impetus -
24 -

25 MS. VAN WAZER: It's good to get kudos

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